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EXAMINER	
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ART UNIT	**PAPER NUMBER**
2129	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/507,112	HE, LIWEN	
	Examiner	Art Unit	
	Omar F. Fernández Rivas	2129	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 November 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-21 and 23-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21 and 23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *A1, A2*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is in response to an amendment filed by the Applicant entered on November 30, 2007.

2. The Office Actions of July 30, 2007, December 12, 2006, and May 17, 2006 are incorporated into this Final Office Action by reference.

Status of Claims

3. Claims 1, 3, 14, 21 and 23-25 have been amended. Claim 2 has been cancelled. Claims 1, 3-21 and 23-25 are pending on this application.

Claim Rejections - 35 USC § 112

4. In light of the amendments made on claims 1, 14, 21, 24, and 25, the rejection under 35 USC 112 has been withdrawn.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-6, 8-21 and 23-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Corne et al. (PCT #WO 02/03716 A1, referred to as **Corne**).

Claims 1 and 21

Corne anticipates an automated computerized method for optimizing allocation of a set W of n tasks to m available resources for accomplishing such tasks using combinatorial multimodal optimization for finding multiple optimal ways of dividing said set W of n task values into m respectively groups associated with said resources, such that each of the groups satisfies a respective constraint condition (**Corne**: p9, L16-21; p12, L26 to p15, L19; p24, L12 to P25, L11; Figs. 3 and 4; Examiner's Note (EN): data traffic processed by the nodes in a network are tasks. The nodes in the network are resources. The methods used to find the optimal solution are combinatorial multimodal optimization techniques as understood from paragraph 3 of the present application), the method including execution of a computer program to automatically perform a series of machine operations comprising: (a) receiving digital data signals representing plural tasks for assignment to available resources and, based thereon, defining an initial population of trial solutions assigning specific tasks to specific resources (**Corne**: P16, L1-4; p27, L3-10; Fig. 3); (b) calculating for each trial solution a fitness vector comprising m elememts, each of which is indicative of whether the constraint condition of a corresponding respective one of the m groups has been satisfied by the trial solution (**Corne**: p2, L4-6; p3, L30 to p4, L13; p8, L26-32; p9, L23-30; p14, L20-27; p16, L5-23; p28, L14-19; EN: paragraph 12 applies. Groups not further defined in the claim. The objectives are considered groups); (c) selecting a plurality of trial solutions for a next generation in dependence upon their respective fitness vectors (**Corne**: p3, L30 to p4, L13; p16, L5-23; p27, L3-24; Figs. 3-5); (d) creating a new population of trial

solutions including the selected earlier trial solutions (**Corne**: P16, L1-26; p28, L21-22; Figs. 3-5); (e) repeating steps (b) to (d) until the population of trial solutions stabilizes, the individual trial solutions of the stable population representing multiple optional ways of dividing the set W of tasks (**Corne**: p16, L1-32; p27, L3-25; Figs. 3-5; EN: the optimum configuration parameters are optional ways of dividing the tasks); and (f) outputting at least one of said stabilized population as an optimized allocation of tasks to resources (**Corne**: p27, L26).

Claim 3

Corne anticipates the fitness vector comprises m bits, each bit being indicative of whether the constraint condition of a corresponding one of the m groups has been satisfied (**Corne**: p2, L4-6; p3, L30 to p4, L13; p16, L5-22; P28, L4-19; EN: a computer system operates on bits).

Claim 4

Corne anticipates calculating a fitness value for each individual trial solution (**Corne**: p8, L32 to p9, L6; p24; p28, L4-19; EN: calculating the cost value).

Claim 5

Corne anticipates calculating a fitness value for each individual trial solution in which the fitness value comprises the sum of the bits in the fitness vector (**Corne**: p8, L32 to p9, L6; p24; p28, L4-19; EN: calculating the cost value based on the solution components (the bits in the fitness vector)).

Claim 6

Corne anticipates reserving a proportion of the new population for individual trial

solutions selected at step (c) (**Corne**: p8, L32 to p9, L12; p16, L1 to p17, L4; p27, L10-26; p28, L14-22; Fig. 3; EN: paragraph 12 applies. Selecting a group of first solutions based on the cost).

Claim 8

Corne anticipates step (c) comprises selecting non-dominated individual trial solutions using the criteria of Pareto optimality (**Corne**: p3, L29 to p4, L15; p14, L20-27; p18, L29-33).

Claim 9

Corne anticipates selecting non-dominated individual trial solutions using the criteria of Pareto optimality including ranking non-dominated individual trial solutions by fitness value, and selecting from the ranked list (**Corne**: p3, L29 to p4, L15; p14, L20-27; p18, L29-33).

Claim 10

Corne anticipates only non-dominated individual trial solutions with greatest fitness value may be selected at step (c) (**Corne**: p8, L33 to p9, L8; p16, L1 to p17, L4; p28, L4-19; EN: paragraph 12 applies. Identifying the solutions having the cost value closer to the target).

Claim 11

Corne anticipates step (c) comprises selecting individual trial solutions in dependence upon both their respective fitness vectors and their respective fitness values (**Corne**: p8, L33 to p9, L30; p16, L1 to p17, L4; p28, L4-19; EN: paragraph 12 applies. Identifying the solutions having the cost value closer to the target. The cost

value is determined by the solution components (the fitness vector)).

Claim 12

Corne anticipates crossover and mutation are applied at step (d) to at least some individual trial solutions in the new population (**Corne**: p22, L21-30; p29, L5-7).

Claim 13

Corne anticipates step (c) comprises selecting no more than one individual trial solution for each unique fitness vector (**Corne**: p8, L33 to p9, L30; p16, L1 to p17, L4; p28, L4-19; EN: paragraph 12 applies. Each solution will have its own fitness vector).

Claims 14 and 23

Corne anticipates an automated computerized method of distributing a plurality of tasks between a plurality of devices connected together to form a network, wherein each device has an associated constraint on the amount of tasks that it can perform per unit of time (**Corne**: p9, L16-21; p12, L26 to p15, L19; p24, L12 to P25, L11; Figs. 3 and 4), the method including execution of a computer program to automatically perform a series of machine operations comprising: (a) generating a plurality of trial solution allocations of tasks to devices to form an initial population of allocations (**Corne**: p8, L26-33; p15, L12 to p16, 4; p27, L3-14; p27, L3-10; p29, L16-19;Fig. 3); (b) calculating for each trial solution a fitness vector comprising a plurality of elements each which is indicative of whether the associated constraint of a corresponding respective one of the plurality of devices has been satisfied by the trial solution (**Corne**: p2, L4-6; p3, L30 to p4, L13; p8, L26-32; p9, L23-30; p14, L20-27; p16, L5-23; p28, L14-19; EN: paragraph 12 applies. Groups not further defined in the claim. The objectives are considered

groups); (c) selecting a plurality of allocations of tasks to devices for inclusion in the next generation of allocations in dependence upon their respective fitness vectors (**Corne**: p3, L30 to p4, L13; p16, L5-23; p27, L3-24; Figs. 3-5); (d) creating a next generation of allocations of tasks to devices by including the allocations selected in step (c) together with new allocations, each of which is formed from a combination of two or more of the allocations selected in step (c) (**Corne**: P16, L1-26; p28, L21-22; Figs. 3-5); (e) repeating steps (b) to (d) until the population stabilizes (**Corne**: p16, L1-32; p27, L3-25; Figs. 3-5); and (f) outputting an allocation of the tasks among the devices according to one of the allocations included in the stabilized population (**Corne**: p27, L26).

Claim 15

Corne anticipates the devices are processors within a multi-processor computer system (**Corne**: p24, L12 to p25, L30; EN: paragraph 12 applies. The method could be parallelized (multiprocessors). Moreover, the clients and servers contain processors (a multiprocessor computer system).

Claim 16

Corne anticipates the devices are computers within a computer network (**Corne**: p24, L12 to p25, L3; EN: the clients and the servers in the network).

Claim 17

Corne anticipates the devices are routers and the tasks are estimated volumes of traffic to be routed through the routers within a data network, and wherein the allocations are used to form a routing strategy (**Corne**: p16-21; p27, L31 to p28, L2).

Claim 18

Corne anticipates step (c) comprises selecting non-dominated allocations using the criteria of Pareto optimality of the associated fitness vectors (**Corne**: p3, L29 to p4, L15; p14, L20-27; p18, L29-33).

Claim 19

Corne anticipates new allocations are formed in step (d) by performing crossover operations in respect of groups of two or more of the allocations selected in step (c) (**Corne**: p22, L21-30; p29, L5-7).

Claim 20

Corne anticipates mutation operations are applied to one or more of the new allocations formed in step (d) according to a predetermined probability of each new allocation being mutated (**Corne**: p17, L9-24; p22, L21-30; p25, L10-14; p29, L5-7).

Claim 24

Corne anticipates a method of operating a multi-processor computer system to execute a computer program including a set of multiple separate tasks which must all be completed in order for the program execution to be complete (**Corne**: p2, L4-6; p25, L16-21), said method comprising: distributing multiple of said set of program tasks between multiple computer program processor devices to efficiently accomplish all such distributed tasks wherein each computer program processor device has an associated constraint on the amount of tasks that it can perform per unit of time (**Corne**: p24, L25 to p25, L30; EN: it is inherent that every computer or processor can only perform a certain amount of operations at a time), said distribution of tasks to said processor

devices being accomplished by: (a) receiving digital data signals representing a set of plural tasks for assignment to available processor devices and, based thereon, defining an initial population of trial solutions assigning specific tasks to specific processor devices (**Corne**: p8, L26-33; p15, L12 to p16, 4; p27, L3-14; p27, L3-10; p29, L16-19; Fig. 3); (b) calculating for each trial solution a fitness vector comprising a plurality of elements each of which is indicative of whether the constraint of a corresponding respective one of the multiple computer program processor devices has been satisfied by the trial solution (**Corne**: p2, L4-6; p3, L30 to p4, L13; p8, L26-32; p9, L23-30; p14, L20-27; p16, L5-23; p28, L14-19; EN: paragraph 12 applies. Groups not further defined in the claim. The objectives are considered groups); (c) selecting a plurality of trial solutions for a next generation in dependence upon their respective fitness vectors (**Corne**: p3, L30 to p4, L13; p16, L5-23; p27, L3-24; Figs. 3-5); (d) creating a new population of trial solutions including the selected earlier trial solutions (**Corne**: P16, L1-26; p28, L21-22; Figs. 3-5); (e) repeating steps (b) to (d) until the population of trial solutions stabilizes, the individual trial solutions of the stable population representing multiple optional ways of dividing the input set of tasks (**Corne**: p16, L1-32; p27, L3-25; Figs. 3-5); and (f) outputting task assignments to said processor devices in conformance with at least one of said stabilized population as an optimized allocation of tasks to resources (**Corne**: p27, L26).

Claim 25

Corne anticipates a multi-processor computer system for executing a computer program including a set of multiple separate tasks which must all be completed in order

for the program execution to be complete (**Corne**: p2, L4-6; p25, L16-21), said system comprising: a plurality of computer program processors (**Corne**: p24, L25 to p25, L30; EN: paragraph 12 applies. The method can be parallelized (multiple processors). Moreover, a client/server system and a network will have multiple processors working together); and means networked with said multiple computer program processors for distributing multiple of said set of program tasks between said multiple computer program processor devices to efficiently accomplish all such distributed tasks wherein each computer program processor device has an associated constraint on the amount of tasks that it can perform per unit time (**Corne**: p24, L25 to p25, L30; paragraph 12 applies. The communication channels used by the system. It is inherent that computers and processors can only perform a number of functions in a period of time), said distribution of tasks to said processor devices being accomplished by:

(a) receiving digital data signals representing a set of plural tasks for assignment to available processors and, based thereon, defining an initial population trial solutions assigning specific tasks to specific processors (**Corne**: p8, L26-33; p15, L12 to p16, 4; p27, L3-14; p27, L3-10; p29, L16-19; Fig. 3); (b) calculating for each trial solution a fitness vector comprising a plurality of elements each of which is indicative of whether the constraint of a corresponding respective one of the multiple computer program processor devices has been satisfied by the trial solution (**Corne**: p2, L4-6; p3, L30 to p4, L13; p8, L26-32; p9, L23-30; p14, L20-27; p16, L5-23; p28, L14-19; EN: paragraph 12 applies. Groups not further defined in the claim. The objectives are considered groups); (c) selecting a plurality of trial solutions for the next generation in dependence

upon their respective fitness vectors (**Corne**: p3, L30 to p4, L13; p16, L5-23; p27, L3-24; Figs. 3-5); (d) creating a new population of trial solutions including the selected earlier trial solutions (**Corne**: P16, L1-26; p28, L21-22; Figs. 3-5); (e) repeating steps (b) to (d) until the population of trial solutions stabilizes, the individual trial solutions of the stable population representing multiple optional ways of dividing the input set of tasks (**Corne**: p16, L1-32; p27, L3-25; Figs. 3-5), and (f) outputting task assignments to said processors in conformance with at least one of said stabilized population as an optimized allocation of tasks to resources (**Corne**: p27, L26).

Response to Applicant's arguments

6. The arguments regarding the rejection under 35 USC 102 have been fully considered but are not persuasive.

In reference to Applicant's arguments on page 13:

Thus nowhere in Corne is there a teaching, suggestion or motivation to specify a fitness vector for which each element corresponds to a respective grouping in a resource allocation problem, as now required by the present claims.

Examiner's response:

Paragraph 12 applies. As disclosed by Corne, in multi-objective optimization problems, the measure of a solution's quality is a vector of measures relating to two or more objectives (read as groups since no definition or restriction to the structure or contents of these groups has been defined in the claim). The evaluation function in a multi-objective problem is a vector composed of the evaluation functions for each objective (elements of the vector) (**Corne**: p3, L30-33). There will be one objective

function for each of the objectives (**Corne**: p14, L20-27; p16, L1-22). Clearly, each of the objective functions (elements) corresponds to one of the objectives (groupings).

In reference to Applicant's arguments on page 14:

It is noted that the Examiner has cited 5 portions of Corne as teaching the features of claim 2. However none of these citations teach providing a fitness vector having as many elements as there are groupings, each of which corresponds to a respective resource (e.g. a processor, computer or router, etc.).

Examiner's response:

Paragraph 12 applies. The arguments above regarding the fitness vector, evaluation functions (elements) and objectives (groups) applies. Moreover, Corne discloses that there is an evaluation function for each objective (**Corne**: p14, L20-27). Clearly, there will be as many elements in the fitness vector as there are objectives.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Corne as set forth above in view of Buckzak et al (US Paten #6,957,200, referred to as **Buczak**).

Claim 7

Corne does not teach a non-reserved proportion of the new population is generated using a Roulette wheel selection method.

Buczak teaches a non-reserved proportion of the new population is generated using a Roulette wheel selection method (**Buczak**: C6, L33-41; C8, L56 to C9, L7; C18, claim 12).

It would have been obvious to one of ordinary skill in the arts at the time of the applicant's invention to modify the teachings of Corne by incorporating generating a non-reserved proportion of the new population using the roulette wheel method as taught by Buczak for the purpose of having a process that selects individuals from the population for mating based on the fitness of the genes in the population.

Response to Applicant's arguments

8. The Applicant's arguments regarding the rejection under 35 USC 103 have been fully considered but are not persuasive.

In reference to Applicant's arguments on page 15:

The Examiner has cited Buckzak merely for disclosing a non-reserve proportion of the new population as generated using a roulette wheel selection method. Accordingly, it should be clear that Buckzak does not solve the deficiencies noted above with respect to Corne. Accordingly, claim 7 is believed to patentably define over the cited references taken either singly or in combination.

Examiner's response:

As set forth above, Corne teaches all of the limitations of the claims from which claim 7 depends on. The combination of Corne and Buckzack teach all of the limitations of claim 7 as set forth in the rejection above.

Examination Considerations

9. The claims and only the claims form the metes and bounds of the invention. "Office personnel are to give the claims their broadest reasonable interpretation in light of the supporting disclosure. In re Morris, 127 F.3d 1048, 105455, 44USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Limitations appearing in the specification but not recited in the claim are not read into the claim. In re Prater, 415 F.2d, 1393, 1404-05, 162 USPQ 541, 550-551 (CCPA 1969)" (MPEP p 2100-8, c 2, l 45-48; p 2100-9, c 1, l 1-4). The Examiner has full latitude to interpret each claim in the broadest reasonable sense. Examiner will reference prior art using terminology familiar to one of ordinary skill in the art. Such an approach is broad in concept and can be either explicit or implicit in meaning.

10. Examiner's Notes are provided with the cited references to prior art to assist the applicant to better understand the nature of the prior art, application of such prior art and, as appropriate, to further indicate other prior art that maybe applied in other office actions. Such comments are entirely consistent with the intent and spirit of compact prosecution. However, and unless otherwise stated, the Examiner's Notes are not prior art but a link to prior art that one of ordinary skill in the art would find inherently appropriate.

11. Unless otherwise annotated, Examiner's statements are to be interpreted in reference to that of one of ordinary skill in the art. Statements made in reference to the condition of the disclosure constitute, on the face of it, the basis
and such would be obvious to one of ordinary skill in the art, establishing thereby

an inherent prima facie statement.

12. Examiner's Opinion: paragraphs 9-11 apply. The claims and only the claims form the metes and bounds of the invention. The Examiner has full latitude to interpret each claim in the broadest reasonable sense.

Conclusion

13. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

14. Claims 1, 3-21 and 23-25 are rejected.

Correspondence Information

15. Any inquires concerning this communication or earlier communications from the examiner should be directed to Omar F. Fernández Rivas, who may be reached

Monday through Friday, between 8:00 a.m. and 5:00 p.m. EST. or via telephone at (571) 272-2589 or email omar.fernandezrivas@uspto.gov.

If you need to send an Official facsimile transmission, please send it to (571) 273-8300.

If attempts to reach the examiner are unsuccessful the Examiner's Supervisor, David Vincent, may be reached at (571) 272-3080.

Hand-delivered responses should be delivered to the Receptionist @ (Customer Service Window Randolph Building 401 Dulany Street Alexandria, VA 22313), located on the first floor of the south side of the Randolph Building.

Omar F. Fernández Rivas
Patent Examiner
Artificial Intelligence Art Unit 2129
United States Department of Commerce
Patent & Trademark Office

OFR

Friday, January 25, 2008.

DAVID VINCENT
SUPERVISORY PATENT EXAMINER
1/29/08